

Metadata Working Group

The NOAA IOOS Metadata Working Group (NIMWG) includes experts from several NOAA Line Offices. They held bi-weekly telecons to discuss IOOS metadata requirements.

How does your project/working group compliment or link with DIF activities?

Data integration efforts like IOOS face many technical barriers. Once those barriers are overcome, the real work – understanding the integrated picture – begins. That can not be done without understanding the data. That requires readily available and understandable documentation - metadata.

What is the current status? Provide brief update.

This working group formulated some recommendations to be presented to the IOOS Program at this meeting.

Milestones and Challenges

Success stories, project accomplishments, benefits.

The group used the GEO-IDE Wiki as a home base and a significant amount of material was added to that wiki by Ted (metadata) and Alex (DMAC Data Management Guide). We also came to understand how some simple capabilities that are build into the wiki (categories) could be helpful in arranging content and making it more findable.

In the time since this group started – the North American Profile of the ISO Metadata Standard has been approved and general consensus is forming across NOAA that the ISO metadata standards are the target at this time.

*What have been the challenges (technical or strategic) to this project/working group?
How were challenges resolved?*

Engaging a volunteer community is difficult in a situation where everyone is already overwhelmed with their own tasks. This challenge has yet to be resolved.

Wiki: <http://www.nosc.noaa.gov/dmc/swg/wiki> IOOS Metadata Working Group



Next Steps/ Recommendations

What is the next phase of your project/working group?

We are using the best tools for collecting community input and guidance. We need to expand the contributing portion of the IOOS community.

Provide recommendations for going forward

We have recommendations in three areas: Standards, Tools, and Terminology and questions about a registry.

Metadata Recommendations: Standards

The Program needs to identify and document metadata content that is required to support all data related capabilities and services.

Guidance for representing that content needs to be provided for the ISO 191*, FGDC with appropriate extensions, and Directory Interchange Format (DIF) metadata standards, in that order of priority.

Content already identified as important includes: file formats and structures, data attribute details, data transformations, quality control procedures, quality flags (with definitions), and data error characteristics.

Metadata Recommendations: Tools

The Program needs to identify and help document metadata tools that are 1) being used by IOOS Data Providers and 2) other groups or programs to create and maintain standard metadata. This guidance should be focused and integrated with the service and capability descriptions described above.

The Program should identify, document, and help test tools and stylesheets (XSLTs) for translating existing metadata into the ISO 191* standards and for translating metadata content from the ISO Standards into other standards. If tools supporting specific translations can not be identified, the Program should consider leading the development of those tools.

Metadata Recommendations: Terminology

The Program should evaluate existing vocabularies related to ocean observations and identify a small number (2-3) to focus adaptation or development efforts on.

The Program should work with the Marine Metadata Initiative to engage the broader IOOS community in this process.

The Program should focus on vocabularies related to ocean observations rather than data taxonomies or other higher-level items.

Metadata Recommendations: Registry

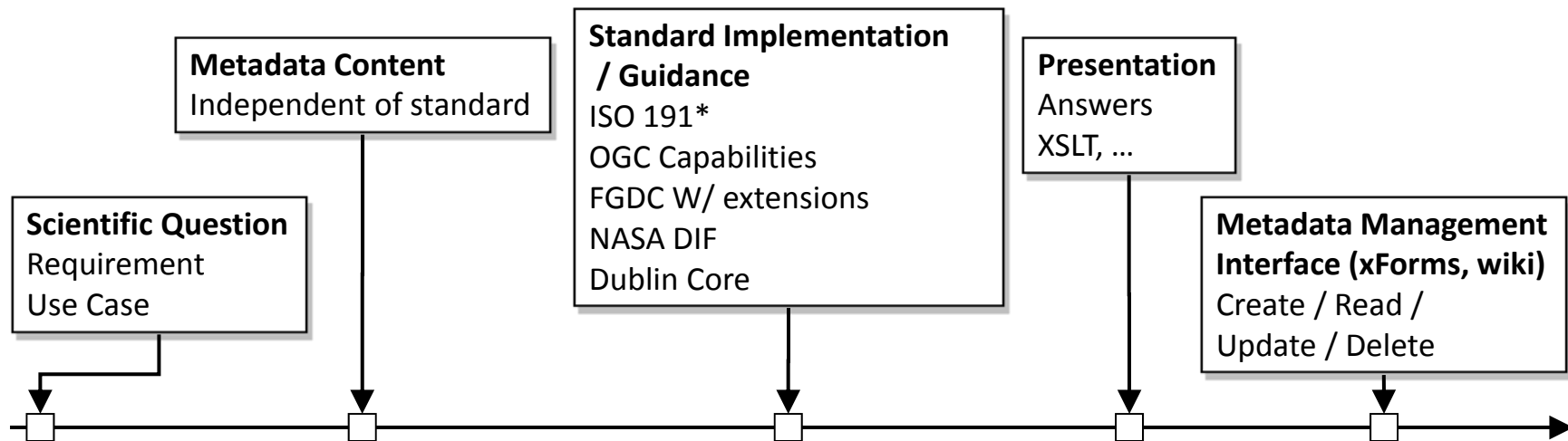
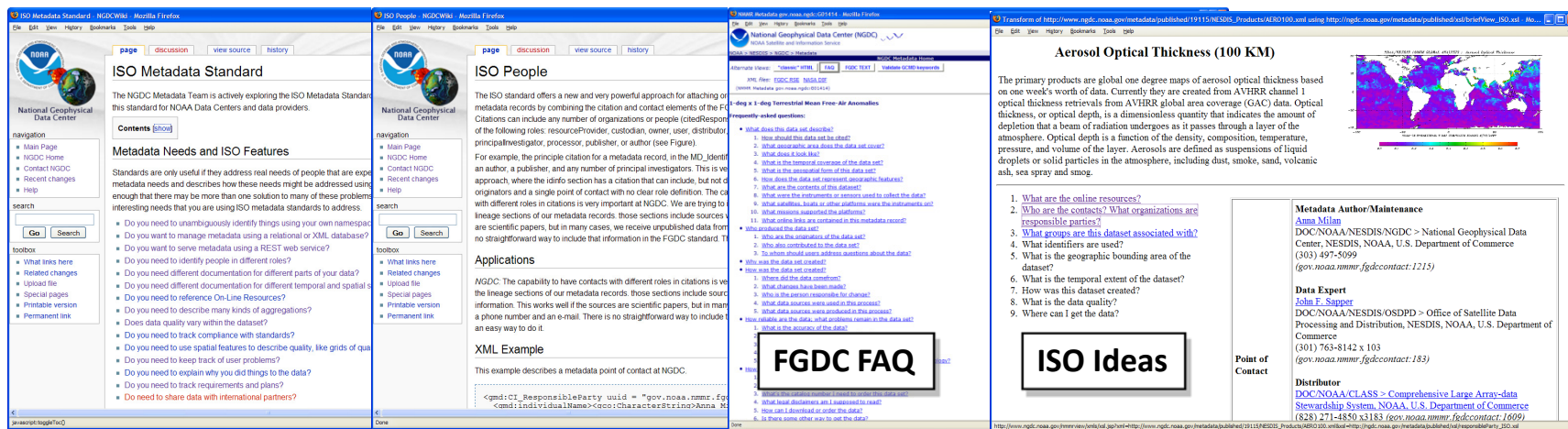
What would this registry contain (metadata, URNs)?

What is the scope of the registry? It would clearly include metadata for environmental datasets. Would it also include information about regulatory, administrative, legal enforcement, protected resources, habitat data?

What is the relationship between an IOOS registry and others?
How can we use existing registries effectively?

How are the linkages between metadata in the registry and the data they describe tested and maintained?

Use Case to CRUD



The Working Group Home Page

The screenshot shows a Mozilla Firefox browser window displaying the NOAA IOOS Metadata Working Group (NIMWG) home page. The browser's address bar shows the URL <http://opendap.c...PS%3A%3A8454000>. The page title is "IOOS Metadata Working Group - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox".

The page features a NOAA logo and the text "National Geophysical Data Center" on the left. A navigation menu includes links for "Main Page", "Categories", "Recent changes", and "Help". A search box with "Go" and "Search" buttons is also present. A toolbox on the left lists links for "What links here", "Related changes", "Upload file", "Special pages", "Printable version", and "Permanent link".

The main content area is titled "IOOS Metadata Working Group" and includes a "Contents [show]" link. The page is divided into several sections, each with an "[edit]" link:

- Overview and purpose of NOAA IOOS Metadata Working Group (NIMWG)**: The purpose of the NOAA IOOS Metadata Working Group (NIMWG), which is being led by Ted Habermann, is to develop recommendations regarding metadata for the IOOS Integrated Products Team (IPT) to consider at their Summer 2009 workshop (currently scheduled for August 2009). We are also working to identify and document [outstanding opportunities](#) and [use cases](#) for DIF metadata. Please feel free to use the talk feature (found by clicking on the "discussion" link) to post comments or thoughts on this material. If you are interested in joining the working group please contact Ted.
- NOAA IOOS Metadata Requirements**
- Approach**: The NIMWG embraces the overall IOOS guiding vision of "Adopt, Adapt, and only as a last resort, Develop" and has evaluated the existing metadata requirements with that vision in mind. As a result, our recommendations lean significantly towards the adopt end of this spectrum.
- Metadata Existence and Availability**: The NOAA IOOS Program, henceforth The Program, should work with Data Providers to ensure that standard metadata is created and maintained for all IOOS datasets and services. These metadata should be available through the NASA Global Change Master Directory (Directory Interchange Format), Geospatial One-Stop (FGDC + appropriate ex-tensions), and the Global Earth Observing System of Systems (ISO 19115, 19115-2, and 19119, OGC Capabilities).
- Metadata Standards**: The Program needs to identify and document metadata content that is required to support all data related capabilities and services. Guidance for representing that content needs to be provided for the ISO 191*, FGDC with appropriate extensions, and Directory Interchange Format (DIF) metadata standards, in that order of priority. Content already identified as important includes: file formats and structures, data attribute details, data transformations, quality control procedures, quality flags (with definitions), and data error characteristics. Services and capabilities supported using this content need to be elucidated.
- Consistent Terminology**: The Program should evaluate existing vocabularies related to ocean observations and identify a small number (2-3) to focus adaptation or development efforts on. The Program should work with the Marine Metadata Initiative to engage the broader IOOS community in this process. The Program should focus on vocabularies related to ocean observations rather than data taxonomies or other higher level items.

The browser's status bar at the bottom shows "Done" and the URL www.noscr.noaa.gov.

Categories Arrange Content

The screenshot shows a web browser window titled "Categories - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox". The address bar shows the URL "http://opendap.c...PS%3A%3A8454000". The page features the NOAA logo and the text "National Geophysical Data Center". A navigation menu on the left includes links for "Main Page", "Categories", "Recent changes", and "Help". A search box with "Go" and "Search" buttons is also present. The main content area is titled "Categories" and contains the text "The following categories contain pages or media." Below this is a search bar with the label "Categories" and a "Go" button. A list of categories follows, each with a member count: DART Metadata (3 members), FGDC CSDGM (1 member), Fast Track Standards (2 members), GEO-IDE (4 members), IOOS DIF (5 members), ISO 19115 (23 members), ISO 19119 (2 members), ISO 19139 (4 members), Integrated Ocean Observing System (IOOS) (7 members), Metadata (9 members), Metadata Examples (1 member), Metadata Standards (8 members), Metadata Working Group (3 members), Multidimensional Grids (4 members), OceansITES Metadata (1 member), Open Geospatial Consortium Standards (2 members), Other Standards (2 members), Proposed Best Practice or Standard (7 members), SensorML (2 members), and Standards (4 members). The page footer includes links for "Privacy policy", "About GEO-IDE Guidelines and Best Practices Wiki", and "Disclaimers", along with a "Powered By MediaWiki" logo. The status bar at the bottom shows "Done" and the URL "www.nosc.noaa.gov".

Categories - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox

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Categories

The following categories contain pages or media.

Categories

Display categories starting at: Go

(first | last) View (previous 50) (next 50) (20 | 50 | 100 | 250 | 500)

- DART Metadata (3 members)
- FGDC CSDGM (1 member)
- Fast Track Standards (2 members)
- GEO-IDE (4 members)
- IOOS DIF (5 members)
- ISO 19115 (23 members)
- ISO 19119 (2 members)
- ISO 19139 (4 members)
- Integrated Ocean Observing System (IOOS) (7 members)
- Metadata (9 members)
- Metadata Examples (1 member)
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- Open Geospatial Consortium Standards (2 members)
- Other Standards (2 members)
- Proposed Best Practice or Standard (7 members)
- SensorML (2 members)
- Standards (4 members)

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Opportunities and Use Cases

Metadata Opportunities and Use Cases - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox

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Metadata Opportunities and Use Cases

Contents [show]

Metadata Needs and ISO Features [edit]

Metadata is are only useful if it addresses real needs of people. This section presents a number of potential metadata needs and describes how these needs might be addressed using ISO metadata. Of course, the standards are broad and flexible enough that there may be more than one solution to many of these problems. Please add alternative solutions that you have found useful or interesting needs that you are using ISO metadata standards to address.

- Do you need to unambiguously identify things using your own namespace?
- Do you want to manage metadata using a relational or XML database?
- Do you want to serve metadata using a REST web service?
- Do you need to identify people in different roles?
- Do you need different documentation for different parts of your data?
- Do you need different documentation for different temporal and spatial subsets?
- Do you have datasets with multiple sources?
- Do you need to reference On-Line Resources?
- Do you need to describe many kinds of aggregations?
- Does data quality vary within the dataset?
- Do you need to track processing for multiple data sources?
- Do you need to track compliance with standards?
- Do you need to use spatial features to describe quality, like grids of quality flags?
- Do you need to keep track of user problems?
- Do you need to explain why you did things to the data?
- Do you need to track requirements and plans?
- Do you need to share data with international partners?
- Do you need to describe data formats and structures?
- Do you have datasets in multiple locations?
- Do you need to track data transformations and processing?
- Do you need to describe instruments used to make observations?

Data Attribute Details [edit]

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The Data Provider Guide

The screenshot shows a web browser window titled "IOOS DIF DATA PROVIDER GUIDE - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox". The address bar shows the URL "http://opendap.c..._PS%3A%3A8454000". The browser's menu bar includes File, Edit, View, History, Bookmarks, Tools, and Help. The page content is displayed in a structured layout. On the left, there is a sidebar with the NOAA logo and the text "National Geophysical Data Center". Below this, there is a "navigation" section with links to "Main Page", "Categories", "Recent changes", and "Help". A "search" section includes a search box and "Go" and "Search" buttons. A "toolbox" section contains links for "What links here", "Related changes", "Upload file", "Special pages", "Printable version", and "Permanent link". The main content area is titled "IOOS DIF DATA PROVIDER GUIDE" and includes a "Contents [show]" link. The first section is "Document purpose and history" with an "[edit]" link. The text in this section discusses the IOOS's potential for presenting geospatial data and the goal of the DIF program to facilitate data sharing. The second section is "Basic Web Services Concepts" with an "[edit]" link. The text in this section discusses standard protocols and Web services, such as HTTP, SOAP, WSDL, and XML, and mentions the World Wide Web Consortium (W3C) and the Open Geospatial Consortium (OGC). The browser's status bar at the bottom shows "Done", a search bar with "Find: OR", and a message "Reached end of page, continued from top". The URL "www.nosc.noaa.gov" is visible in the bottom right corner.

IOOS DIF DATA PROVIDER GUIDE - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox

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IOOS DIF DATA PROVIDER GUIDE

Contents [show]

Document purpose and history [edit]

The IOOS has enormous potential to present geospatial data on open oceans, coastal waters, and Great Lakes in the formats, rates, and scales required by scientists, managers, businesses, governments, and general public to support research and inform decision-making. However, because there are so many incompatible standards in the geo-information technology area, sharing data between systems and between user communities requires considerable time and expertise. DIF goal is to facilitate data sharing by establishing certain standards in data formats, encoding and transport, and let any data provider to participate in IOOS program.

The present document has been developed in addition to and in elaboration of the *Guide for IOOS Data Providers* [12]. The *Guide for IOOS Data Providers* was compiled in 2006, and has not been updated since then; it offers high-level recommendations for selection, development and implementation of DMAC-compliant services and data formats. Most of these recommendations are of limited practical importance; some of them are completely obsolete.

In contrast to the previous version of the Guide, the present document is focused on practical needs of prospective data providers. It accumulates the practical experience of IOOS Data Integration Framework (DIF) of development and implementation of standardized data encoding methods and transport mechanisms for a limited number of core IOOS data variables. Recommendations offered by the present document are completely based on real projects; the document goal is to facilitate the implementation of trusted solutions.

However, since DIF is an ongoing project, the current version of the Guide is not fully developed. It is expected that the members of community will The ultimate goal of the Wiki version of the document is to provide a vehicle for community members to share their valuable experience and knowledge by adding and editing the content.

Basic Web Services Concepts [edit]

IOOS DIF encompasses standard protocols and Web services, e.g. HTTP, Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL), Extensible Markup Language (XML); information technology committees such as the World Wide Web Consortium (W3C) and Open Geospatial Consortium (OGC) are addressing these comprehensive standards.

In order to join the data provider must agree to provide access to their data through one or more of the specifications adopted by the IOOS DIF. However, this does not require data providers to change the internal data storage formats.

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DART Instrument Descriptions

The screenshot shows a web browser window titled "Entity Attribute DART FGDC - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox". The address bar shows the URL "http://opendap.c...PS%3A%3A8454000". The page is a wiki page for "Entity Attribute DART FGDC". The left sidebar contains the NOAA logo, "National Geophysical Data Center", and navigation links: "Main Page", "Categories", "Recent changes", and "Help". Below this is a search box with "Go" and "Search" buttons, and a toolbox with links: "What links here", "Related changes", "Upload file", "Special pages", "Printable version", and "Permanent link". The main content area has tabs for "page", "discussion", "edit", "history", "delete", "move", "protect", and "watch". The title is "Entity Attribute DART FGDC". Below the title is a section "Entities and Attributes" with an "[edit]" link. The text describes the FGDC CSDGM Standard and the domains of attributes. Below this is a section "Instrument Information as Entities and Attributes" with an "[edit]" link. The text describes a metadata record for a DART buoy dataset and provides a URL for downloading full DART records. Below the text is a code block containing XML metadata for a Bottom Pressure Recorder. The footer of the browser window shows "Done" and "www.nosc.noaa.gov".

Entity Attribute DART FGDC - GEO-IDE Guidelines and Best Practices Wiki - Mozilla Firefox

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Entity Attribute DART FGDC

Entities and Attributes [\[edit\]](#)

The FGDC CSDGM Standard includes an Entity and Attribute section designed for describing the spatial entities included in a dataset and the attributes associated with those entities. In general, the entities should be mappable items and the attributes might be used to symbolize the map.

The domains of the attributes can be describes as a range (min, max, and units), an enumeration (values with definitions), a codelist, or free text.

Instrument Information as Entities and Attributes [\[edit\]](#)

For this example we will use a metadata record that was created for a DART buoy dataset. The metadata standard in practice has been FGDC with RSE. The metadata records currently describe 1 deployment of a Bottom Pressure Recorder (BPR), the data recording system of the DART that rests on the seafloor until retrieval. The reason for this level of granularity in the metadata is several: 1) date range changes, 2) location changes (not by a large amount, but nonetheless), 3) instrument identifiers could change. With all this in mind, I could not create 1 station metadata record and track all these changes in FGDC. The example with describe what was done for entities and attributes. As you will see there is a lot of instrument information in the E & A section. The E & A section was readable, so I placed the information there. You can download full DART records at the following URL:

http://www.ngdc.noaa.gov/metadata/published/DART_BPR/list

This is an subset of the Entity and Attribute section in DART record [gov.noaa.ngdc.dart_bpr.D171_2003](http://www.ngdc.noaa.gov/metadata/published/DART_BPR/list). It includes one entity, the Bottom Pressure Recorder, and attributes with several types of ranges. Note that the single values of numeric attributes are indicated by equal minimum and maximum values.

```
<eainfo>
  <detailed>
    <enttyp>
      <enttyp1>
        Bottom Pressure Recorder
      </enttyp1>
      <enttypd>
        An acoustic modem, acoustic release unit and battery pack bolted to a platform, to which a disposable anchor, flo
      </enttypd>
      <enttypds>
        http://nctr.pmel.noaa.gov/Dart/dart_bmoor.html
      </enttypds>
    </enttyp>
    <attr>
      <attr1>
        Depth
      </attr1>
    </attr>
  </detailed>
</eainfo>
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